



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

$$(a) \ 1; (\alpha_0\beta_0); (\alpha_1\beta_1); (\alpha_0\beta_0)(\alpha_1\beta_1),$$

$$(b) \ 1; (\alpha_0\beta_0)(\alpha_1\beta_1); (\alpha_0\alpha_1\beta_0\beta_1); (\alpha_1\alpha_0\beta_1\beta_0),$$

$$(c) \ 1; (\alpha_0\beta_0)(\alpha_1\beta_1); (\alpha_0\alpha_1)(\beta_0\beta_1); (\alpha_0\beta_1)(\alpha_1\beta_0).$$

The group must be transitive since the equation is irreducible. Hence we may exclude (a).

It cannot be (b) since (b) is the regular cyclic group, and the equation, if this were its group, would be Abelian.

We compute $(\alpha_0 - \beta_0)(\alpha_1 - \beta_1)$ which belongs to the group (c):

$$\alpha_0\beta_0 + \alpha_1\beta_1 + \alpha_0\beta_1 + \alpha_1\beta_0 + \alpha_0\alpha_1 = b.$$

$$\therefore \alpha_0\beta_1 + \alpha_1\beta_0 + \alpha_0\alpha_1 + \beta_0\beta_1 = b - 2.$$

Factoring this, $(\alpha_0 + \beta_0)(\beta_1 + \beta_1) = b - 2$. Squaring, and remembering that $\alpha_0\beta_0 = \alpha_1\beta_1 = 1$,

$$(\alpha_0 - \beta_0)^2(\alpha_1 - \beta_1)^2 = [(\alpha_0 + \beta_0)^2 - 4][(\alpha_1 + \beta_1)^2 - 4].$$

$\therefore (\alpha_0 - \beta_0)(\alpha_1 - \beta_1) = 2\sqrt{[(1 + \frac{1}{2}b)^2 - a^2]}$, and as the irrationality of the radical is one of the conditions for irreducibility this group cannot be the group of the equation. The group of the equation is therefore G_8 .

PROBLEMS FOR SOLUTION.

ALGEBRA.

208. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College Defiance, O.

$$\text{Solve } x^4 + y^4 = 14x^2y^2; \ x + y = m.$$

209. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, O.

$$\text{Prove that } (a^4 + b^4 + c^4 + d^4) > 4abcd.$$

210. Proposed by W. J. GREENSTREET, A. M., Editor of The Mathematical Gazette, Stroud, England.

The sum of five quantities and the sum of their cubes are both zero. Show that the sum of their fifth powers is a factor of the sum of any odd powers of the quantities.

GEOMETRY.

236. Proposed by J. R. HITT.

If two sides of a triangle pass through a fixed point, the third side touches a fixed circle.

237. Proposed by S. A. COREY, Hiteman, Iowa.

Let AB, BC, CD, DE, EA be the sides of a pentagon, plain or gauche. Double the length of CB and DE by extending from B and E to G and H , respectively. Draw $B'D$ parallel to and of the same currency as BC . Connect G and H . Then prove that $2(AB^2 + BC^2 + CD^2 + DE^2 + EA^2) = 3CD^2 + 4(DE \cdot BC \cdot \cos EDB + EA \cdot AB \cdot \cos EAB) + GH^2$.

238. Proposed by O. W. ANTHONY, Head of the Mathematical Department, DeWitt Clinton High School, New York.

Construct a trapezoid having given the sum of the parallel sides, the sum of the diagonals, and the angle formed by the diagonals.

CALCULUS.

183. Proposed by W. J. GREENSTREET, A. M., Stroud, England.

Evaluate $\int_0^\infty \frac{\sin 2nx dx}{(a^2 + x^2) \sin x}$.

184. Proposed by W. J. GREENSTREET, A. M., Stroud, England.

If $u = f(x, y)$; $\xi = e^x y$; $\eta = e^x$; show that

$$\frac{d^2 u}{dx^2} - y^2 \frac{d^2 u}{dy^2} - y \frac{du}{dy} = 4\xi\eta \frac{d^2 u}{d\xi \cdot d\eta}.$$

MECHANICS.

121. Proposed by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va.

Prove that the electrical capacity of an oblate ellipsoid of revolution is $\sqrt{(a^2 - b^2)}/\cos^{-1}(b/a)$, where a and b are the equatorial and polar semi-diameters.

AVERAGE AND PROBABILITY.

156. Proposed by J. E. SANDERS, Hackney, Ohio.

Find the average area of a triangle, the sum of whose sides is constant and equal to $2a$.

DIOPHANTINE ANALYSIS.

122. Proposed by L. E. DICKSON, Ph. D., The University of Chicago.

If p is a prime $(p^4 - 1)(p^2 - 1)$ has no factor of the form $1 + p^3 x$, $x > 0$, if $p > 2$; $(p^6 - 1)(p^4 - 1)(p^2 - 1)$ has no factor of the form $1 + p^5 x$, $x > 0$.